Spectrophotometers provide an accurate method of color analysis for sodas. Image credit: Flickr user Mike Mozart (CC BY 2.0)

One of the great benefits of living in modern society is mass production. If I want a Coke, then it's understood that the beverage I grab in the grocery store check-out line will taste the same as the hundreds I've had over the course of my life. It's not just the taste, or the appearance of the bottle. The color itself is distinctive.

Color uniformity of beverages is more important than consumers might think. A study on expert and "social" wine drinkers found that when a flavorless red dye is added to a white wine, drinkers report markedly different flavor profiles[1]. Or consider the fate of "Crystal Pepsi," widely rejected after its launch in the 1990s—in large part because of its coloration. Consumers had a difficult time enjoying a drink that just didn't look like cola.

Of course, Coke and Pepsi are not alone in having proprietary looks (and tastes). To keep consumers happy, all soda producers strive to maintain consistency—and this requires strict quality control. Fortunately, spectrophotometers allow you to accurately measure and replicate soda coloration, ensuring worldwide production of consistent beverages. But for the best results, you must select the right spectrophotometer—and the right measurement techniques—for your particular beverage.

Managing Consistent Color

Translucent beverages require different color measurement techniques than transparent beverages. Image credit: Flickr user eddie welker (**CC BY 2.0**)

Sodas are typically either transparent or translucent, without any opaque solids. But your analysts must use different spectrophotometric techniques depending upon which category your beverage falls into[2].

Color measurement via transmittance is best for cases where you can see your hand through the container that holds the beverage sample. If the details of your hand *cannot* be seen, then reflectance measurement is typically recommended. This means that beverages like Coke or Dr Pepper are typically best measured via reflectance spectroscopy, while transparent beverages, like Mountain Dew or Sprite, would be better served by using transmittance measurements.

Establishing an average is another critical part of maintaining color consistency[3]. Your analysts can find an average by taking many spectrophotometer readings. These are then batched together to even out variations in color. Once a color average is obtained, it can be properly measured—and repeated. For beverage manufacturers who have production and bottling facilities around the world, this repeatability is key. It's what allows a Cherry Coke in Chicago to look and taste identical to a Cherry Coke in Beijing.

A key component to this type of averaging is to pick devices such as the HunterLab UltraScan® VIS. This instrument features a bigger viewing area and measures color in ways that surpass the capabilities of the human eye. While the eye can recognize up to 10 million color combinations, it falls short when it comes to "color memory." In other words, even a highly trained analysts will be unable to precisely recall a previously viewed color. But spectrophotometers excel at color matching because they can detail millions of different colors while recognizing when a color falls outside of previously established norms.

Spectrophotometers can differentiate between subtle color variations that are invisible to the human eye. Image credit: Flickr user dennis crowley (**CC BY 2.0**)

Leveraging Spectrophotometer Technology

High-quality spectrophotometers such as the HunterLab UltraScan® VIS provide beverage makers with a tool to accurately measure coloration of both transparent and translucent sodas. The instrument features an advanced optical system that allows it to take reliable measurements of dark samples, and it's ideally suited for quality control.

HunterLab is a leading provider of spectrophotometers in the food and beverage industry. We've worked with leading manufacturers to help improve their quality control processes and would be glad to help your company do the same. To learn more about which products are best suited to your needs, get in touch with us today.

1. "On the psychological impact of food colour," April 2015, **https://flavourjournal.biomedcentral.com/articles/10.1186/s13411-015-0031-3**
2. "Beverage Color Measurement," 2016, **https://www.hunterlab.com/beverage-color-measurement.html**

3. “Eliminating Color Variations: How to Average Samples with Spectrophotometric Analysis,” February 2015, https://www.hunterlab.com/blog/color-measurement-2/eliminating-color-variations-average-samples-spectrophotometric-analysis/